



Changing Needs & Priorities in Requirements & Capabilities for Future Military Space Forces

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Advanced EHF Communications System

Worldwide Protected Connectivity

Supporting Critical C²

**Nuclear
Protection**

**Anti-Jam
Protection**

**Mission: Provide DoD
secure, survivable comm**

**Geographically
Concentrated Users**

Fixed Users

Battle Groups



Mobile Users

Special Ops



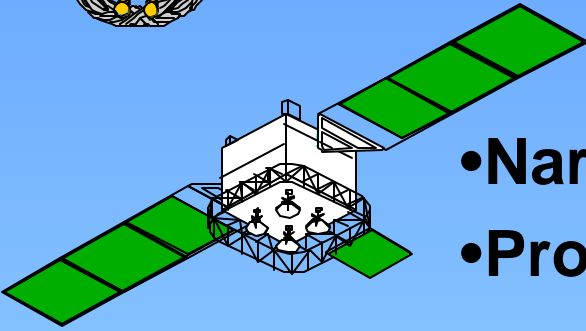
Dispersed Users



**Worldwide 24-hr coverage between 65N to 65S
lat; anti-jam capability;
survivable; ~1.0 Gbps throughput; Milstar
compatible**



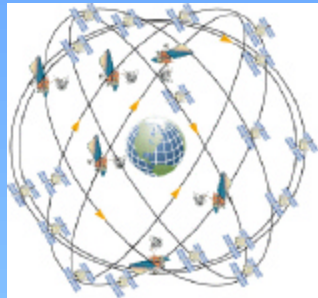
Mobile User Objective System



- **Narrow-band Satellite Communications**
- **Provides Tactical C2 for the warfighter**
 - **Improved performance over UHF Follow-On in jungle, cities, bad weather, other austere environments**
 - **Affordable, transportable terminals**
 - **Flexible - supports anyone at proper frequency in the coverage area**
 - **Susceptible to electro-magnetic interference**
 - **Most oversubscribed MILSATCOM system**
 - **Latest budget delivers MUOS FOC in FY13**

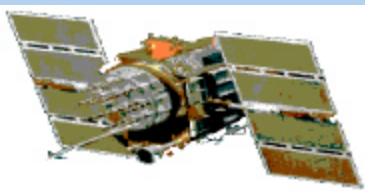


Global Positioning System



- GPS provides all weather targeting, precision engagement, lessens collateral damage, increases sortie efficiency
- Enables synchronization of attack as well as network time for C2 and interoperability
- Modernization plan increases robustness, accuracy, integrity, & availability

New civil and military signals



GPS IIA/R



GPS IIR-M, IIF

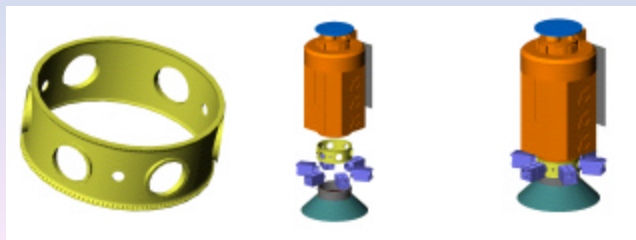
**Anti-jam, Accuracy,
Availability, Integrity,
Flexibility/growth**

GPS III





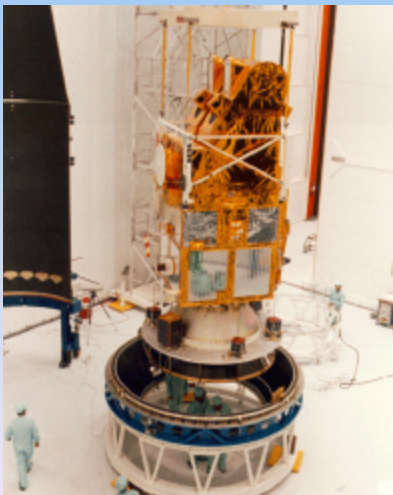
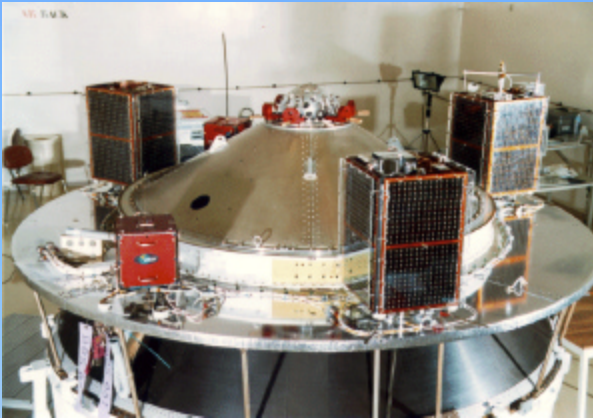
Rapid Assured Access to Space



- Spaceplane or other reusable launch vehicle concept provides a long-term flexible response to activities in outside the atmosphere
- Low-cost, fast response expendable boosters offer a potential mid-term solution that can supplement the long-term
- Launch as a secondary payload & other adaptations of current capabilities is most viable means to provide near-term responsive launch



Deployable “Sortie” Satellites

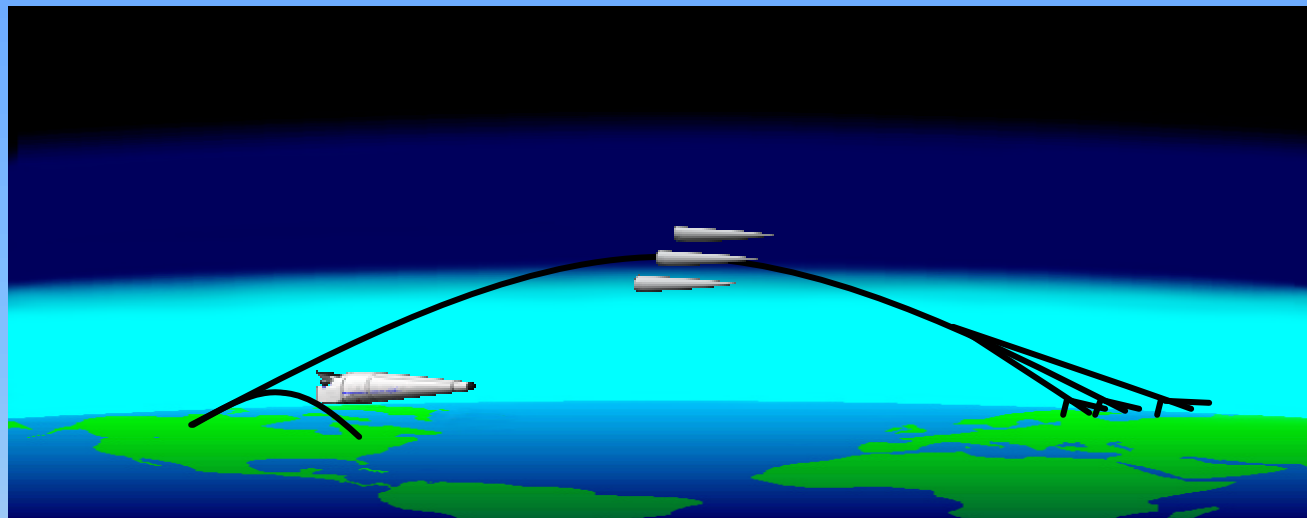


- Short notice deployment on demand
- Lower acquisition cost
 - Modular design for multiple payloads can provide flexibility to address diverse threats at reasonable cost
- Shorter development time
 - Can incorporate leading edge technology
- Lower launch cost

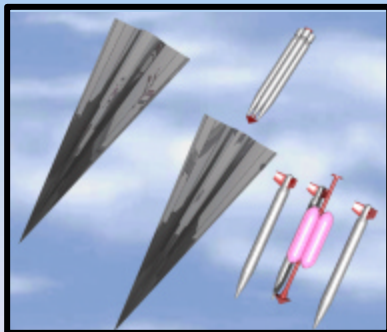


Common Aero Vehicle

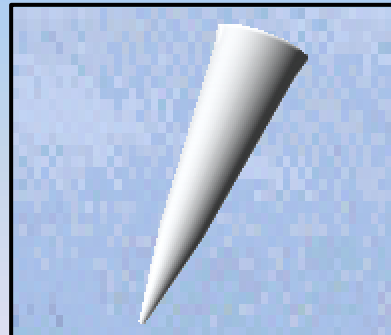
Operational Concept



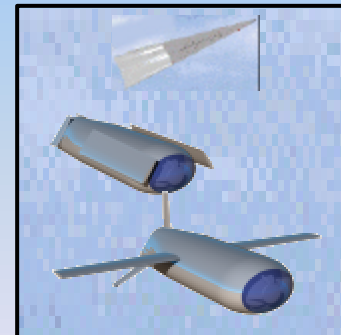
SEAD/Armor



HDBT



RECCE



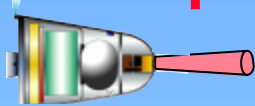
Potential Payloads

**CAV Delivers Next Generation Munitions
Being Developed for Aircraft Systems**

Space Situational Awareness



Characterization
Target Type/Capability



Timeliness

**Short Revisit Interval to
Detect New/Changed
Targets**

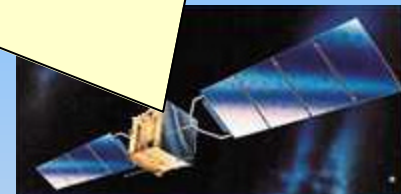
**Accuracy
Targeting
& Weapon
Guidance**



Capacity
**Locate & Track
Multiple Targets**



HEO/GEO



**Detection
Capability**
**Small
Threats**

LEO

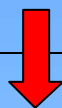




Operational Architectures: The Key To System Interoperability

JOINT OPERATIONAL CONCEPTS

An end-to-end stream of activities that defines how force elements, systems, organizations, and tactics combine to accomplish a military task



OPERATIONAL ARCHITECTURES

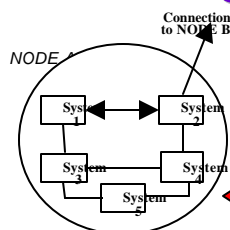
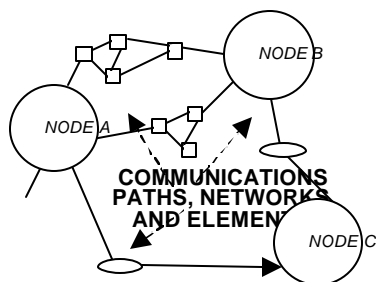
Who has to exchange What with Whom?
What manner (form, frequency, timeliness)?
What processes / activities are supported?

INTEROPERABILITY REQUIREMENTS

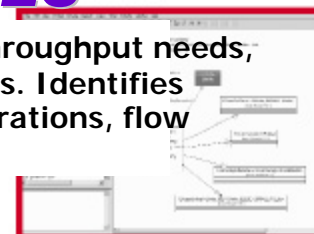


SYSTEM ARCHITECTURES

Analyzes connectivity requirements, throughput needs, interface demands, performance drivers. Identifies optimal mechanisms (systems, configurations, flow paths) for achieving OA requirements



MATERIAL SOLUTIONS



TECHNICAL ARCHITECTURES

INTEROPERABILITY CONSTRAINTS

- Defines rules governing implementation options
- Specifies message formats, file structures, data structures, protocol formats, etc.
- *Incorporates security protocols*

MESSAGE FORMAT

- STANDARDS REFERENCE
- MSG TYPE(S)
- MSG FIELDS W/ REPRESENTATIONS
- MAP FROM LDM TO MSG FIELDS

FILE STRUCTURE

- STANDARDS REFERENCE
- RECORD AND FILE DESCRIPTIONS
- MAP FROM LDM TO RECORD FIELDS



Summary

- **The Role Space Plays in National Security Will Continue to Increase**
 - **Communications and Navigation/Timing are critical today**
- **Threats to Space Assets and Operations Will Develop and Must Be Addressed**
- **Successful space superiority depends on Viable Concepts of Operation**
- **Situational Awareness, Responsive Access, & Payload Developments will determine our ability to maintain space superiority**



BACK-UPS



Implications of Space Commission Report

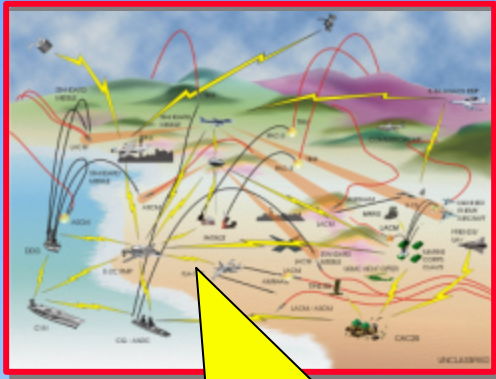
- **Assumptions:**
 - **JV2020 is the Common Goal Throughout DOD**
 - **Space Commission Recommendations Are Consistent with JV2020 & Will Be Implemented**
- **Challenges**
 - **Space Situational Awareness**
 - **Rapid, Assured Access to Space**
 - **Developing/deploying Responsive, tactically relevant capabilities**
- **Priorities**
 - **Realistic CONOPS to drive requirements**
 - **Maturation of Necessary Technologies**

Demonstration Programs Provide Near-Term Means to Develop Technologies & Refine CONOPS



Interrelationships Concept - Architecture - Requirements

Operational Concept



Allows you to

develop

Blueprint of
how to enable
operations

Architecture Filter

Architectural Views

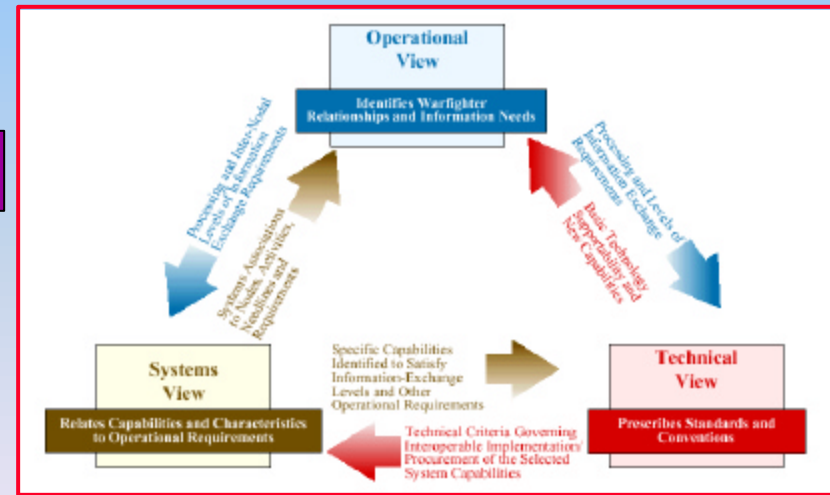
Word picture of
how we operate

Requirements

Determines

Doctrine
Organization
Training
Materiel
Leaders
Personnel
Facilities

Tools with which we
operate





Elements of Transformation

National Military Strategy

Operational
Capabilities

Modeling
& Sim

System of Systems
Interoperability

Architectures

Evolutionary
Acquisition
Process

Legacy
Challenges

Inputs

Challenges &
Enduring
Capabilities

*Joint & Service
Experimentation*

*Concepts and
Requirements*

Outputs

Enhanced
Effectiveness
& Desired
Capabilities

Systems/Programs

Tailored
Program/Budget
Processes

Joint
Experimentation

Operational Concepts
Affordability

D O D | M | J | R | E